

WHAT IS CLAIMED IS:

1. In a method for combusting a fuel and air mixture within a combustion chamber which in a pre-combustion condition contains an amount of fluid, wherein an exhaust flue forms communication between the combustion chamber and an ambient environment, the improvement comprising:

discharging the fuel and air mixture from a flame holding device;
igniting the fuel and air mixture within the combustion chamber; and
discharging a first portion of the amount of the fluid through a pressure relief void in communication with the ambient environment and discharging a second portion of the fluid through the exhaust flue.

2. In a method according to Claim 1 wherein the first portion of the amount of fluid passes through the pressure relief void only upon ignition of the fuel and air mixture.

3. In a method according to Claim 1 further comprising controlling a rate of the fluid passing through the pressure relief void.

4. In a method according to Claim 1 wherein the rate is controlled by sizing the pressure relief void to allow the first portion of the amount of fluid to pass through the pressure relief void upon ignition and to prevent a

combustion flame from passing through the pressure relief void during at least one of ignition and operational combustion.

5. In a method according to Claim 1 wherein the pressure relief void is formed as a peripheral gap between a combustion chamber wall that defines the combustion chamber and the exhaust flue.

6. In a method according to Claim 5 wherein the peripheral gap is in a range from about 0.055 inch to about 0.065 inch.

7. In a method according to Claim 1 wherein the fuel and air mixture is pre-mixed upstream of the flame holding device.

8. In a method according to Claim 7 wherein the fuel and air mixture is pre-mixed within a venturi.

9. In a method according to Claim 1 wherein a first flow rate through the pressure relief void is significantly less than a second flow rate through the exhaust flue.

10. In a method according to Claim 1 wherein the combustion chamber is not substantially sealed.

11. In an apparatus for combusting a fuel and air mixture, the apparatus having a combustion chamber wall defining a combustion chamber, an exhaust flue forming communication between the combustion chamber and an ambient environment, the improvement comprising:

a pressure relief void in communication with the combustion chamber and the ambient environment, and the pressure relief void sized large enough to relieve an ignition pressure from the combustion chamber upon ignition of the fuel and air mixture and sized small enough to prevent a combustion flame from passing through the pressure relief void during at least one of ignition and operational combustion of the fuel and air mixture.

12. In the apparatus according to Claim 11 wherein the pressure relief void is formed as a peripheral gap between the combustion chamber wall and a vessel wall of a vessel.

13. In the apparatus according to Claim 12 wherein the peripheral gap is in a range from about 0.055 inch to about 0.065 inch.

14. In the apparatus according to Claim 12 wherein at least one of the combustion chamber wall and the vessel wall has at least one spacer element that fixes the combustion chamber wall at a distance from the vessel wall.

15. In the apparatus according to Claim 14 wherein the at least one spacer element comprises at least one of the combustion chamber wall and the vessel wall having a protuberance positioned within the peripheral gap.

16. In the apparatus according to Claim 11 wherein a first area of the pressure relief void is sized according to a second area of the exhaust flue so that a first flow rate through the pressure relief void is significantly less than a second flow rate through the exhaust flue.

17. In the apparatus according to Claim 11 further comprising a venturi nozzle forming communication between the combustion chamber and a fuel supply and an air supply.

18. In the apparatus according to Claim 11 further comprising a plurality of burners mounted to discharge into the combustion chamber.

19. In the apparatus according to Claim 18 wherein each of the burners has a self-supporting mat structure forming a burner surface.

20. In the apparatus according to Claim 19 wherein the self-supporting mat structure comprises a plurality of ceramic fibers coated with a silicon carbide material.

21. In the apparatus according to Claim 20 wherein the ceramic fibers are solidly welded together.

22. In the apparatus according to Claim 11 wherein the apparatus is a natural draft and non-condensing gaseous fuel fired water heater.

23. A mounting apparatus for releasably attaching a burner assembly to a bottom wall that at least partially defines a combustion chamber of a water heater, the mounting apparatus comprising:

a flange on the burner assembly, a clip attached to the bottom wall, the clip having an end portion spaced from the bottom wall forming a receiver, a first portion of the flange engageable within the receiver, and a removable fastener fastening a second end of the flange against the bottom wall.

24. The mounting apparatus according to Claim 23, wherein the clip comprises a base portion attached to the bottom wall and the end portion is offset from the base portion.

25. The mounting apparatus according to Claim 23 wherein the removable fastener comprises a screw having an end portion connected to the bottom wall.

26. The mounting apparatus according to Claim 23 wherein the removable fastener comprises a latch removably engageable within a shoulder of the bottom wall.

27. The mounting apparatus according to Claim 23 wherein the clip has a slot and the burner assembly has a seam that engages within the slot to limit movement in at least one direction of the burner assembly with respect to the bottom wall.

28. The mounting apparatus according to Claim 23 wherein with the burner assembly mounted within the clip, the clip limits movement in at least one direction of the burner assembly with respect to the bottom wall.

29. The mounting apparatus according to Claim 23 wherein the bottom wall accommodates two of the burner assemblies.

30. The mounting apparatus according to Claim 29 wherein the bottom wall and the burner assemblies are mounted within a natural draft and non-condensing gaseous fuel fired water heater.

31. In a gaseous fuel fired water heater apparatus having a bottom wall at least partially defining a combustion chamber, a fuel supply and an air supply introducing fuel and air into the combustion chamber, and an exhaust flue forming communication between the combustion chamber and an ambient environment, the improvement comprising:

a plurality of burner assemblies mounted to the bottom wall, the fuel supply and the air supply in communication with each of the burner assemblies, and each of the burner assemblies having a burner exposed to the combustion chamber.

32. In the gaseous fuel fired water heater apparatus according to Claim 31 wherein the burner assemblies are positioned a distance apart from each other forming a catch area between the burner assemblies.

33. In the gaseous fuel fired water heater apparatus according to Claim 32 wherein the catch area is centrally located on the bottom wall for catching at least one of debris fallout and condensation.

34. In the gaseous fuel fired water heater apparatus according to Claim 31 wherein each of the burner assemblies has a mounting apparatus for releasably attaching the burner assembly to the bottom, and the mounting apparatus comprises a flange on the burner assembly, a clip attached to the bottom

wall, the clip having an end portion spaced from the bottom wall forming a receiver, a first portion of the flange engageable within the receiver, and a removable fastener fastening a second end of the flange against the bottom wall.

35. In the gaseous fuel fired water heater apparatus according to Claim 31 wherein the gaseous fuel fired water heater is a natural draft and non-condensing water heater.

36. In a gaseous fuel fired water heater apparatus having a bottom wall at least partially defining a combustion chamber, a fuel supply and an air supply introducing fuel and air into the combustion chamber, and an exhaust flue forming communication between the combustion chamber and an ambient environment, the improvement comprising:

an arcuate burner assembly mounted to the bottom wall, the fuel supply and the air supply in communication with the burner assembly, the burner assembly having a burner exposed to the combustion chamber, and the arcuate burner assembly forming a centrally positioned catch area.

37. In the gaseous fuel fired water heater apparatus according to Claim 36 wherein the arcuate burner assembly is annular.